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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification<sup>4</sup> :</b> A23C 9/00, 23/00, A23L 1/42 C09K 3/30	<b>A1</b>	<b>(11) International Publication Number:</b> WO 86/ 00196 <b>(43) International Publication Date:</b> 16 January 1986 (16.01.86)
<b>(21) International Application Number:</b> PCT/AU85/00135 <b>(22) International Filing Date:</b> 21 June 1985 (21.06.85) <b>(31) Priority Application Number:</b> PG 5625 <b>(32) Priority Date:</b> 21 June 1984 (21.06.84) <b>(33) Priority Country:</b> AU  <b>(71) Applicant (for all designated States except US):</b> SOL-TEC RESEARCH PTY. LTD. [AU/AU]; 7 Brand Road, Scoresby, 3179 VIC (AU). <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only) :</b> TOMLINSON, Rod-erick, Peter, John [AU/AU]; 32 Highwood Drive, Glen Waverley, VIC 3150 (AU). <b>(74) Agent:</b> EDWD. WATERS & SONS; 50 Queen Street, Melbourne, VIC 3000 (AU).		<b>(81) Designated States:</b> AT (European patent), AU, BE (Eu-ropean patent), BR, CH (European patent), DE (Eu-ropean patent), FR (European patent), GB (Euro-pean patent), IT (European patent), JP, LU (Euro-pean patent), NL (European patent), SE (European patent), US.  <b>Published</b> <i>With international search report.</i>
<b>(54) Title:</b> AEROSOL PRODUCT  <b>(57) Abstract</b>  An aerosol dispensable composition comprising in combination (i) 0.05 to 5% of a frothing agent (ii) 0.05 to 75% of a sweetener (iii) 0.05 to 10% of a thickener (iv) 0.01 to 1% of a preservative, and, the balance being selected from other exci-pients, flavours and colourants, propellants and water.		

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AEROSOL PRODUCT

This invention relates to a composition for use in forming milk shake type products.

This invention was conceived as a means for  
5 preparing a flavoured thickened foamy milk-based drink as an alternative to the traditional milk shake which was formed by blending milk with syrup powdered flavours and ice-cream in a mechanical blender. It is an object of the invention to provide a similar milk drink using an aerosol  
10 dispenser.

The requirements of a product of this type should include

- (i) compatibility with existing aerosol packaging types in order to minimise manufacturing cost.
- 15 (ii) a shelf life in an unrefrigerated condition of at least three months.
- (iii) full compliance with food regulations.
- (iv) consumer acceptable flavours as attractive as possible.
- 20 (v) convenience in use.
- (vi) capability of being thickened and frothed in addition to being flavoured.

In order to achieve these objects, it was realised that many constraints existed preventing the formulation of  
25 a successful product as discussed below.

Most flavours have a limited shelf life in solution due to oxidation, microbial attack, enzymatic breakdown, etc.

The product should be of a low viscosity initially,  
30 so that it can be ejected rapidly from the aerosol can to provide the necessary mixing action. This is not easily achieved because the product needs to be concentrated and the thickeners and viscosity builders required in the composition are also concentrated.

35 Conventional aerosol cans are not produced to food quality specifications and the lining systems are not able to hold pressurized, low pH liquids for adequate periods of

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time. However, most food products are packed in liquids at a low pH in order to avoid microbial spoilage.

The necessity to provide preservation of the product in the absence of low pH compositions must be achieved from the narrow range of food approved added preservatives.

The aerosol propellant is normally restricted to non-condensable gases by food regulations in most countries.

Finally food colours are also affected by some of the above parameters and must be properly regulated.

From the above it can be seen that a large number of difficulties stand in the way of providing an acceptable aerosol product.

In order to achieve the above objects, the present invention provides an aerosol dispensable composition comprising in combination

- (i) 0.05 to 5% of a frothing agent,
  - (ii) 0.05 to 75% of a sweetener,
  - (iii) 0.05 to 10% of a thickener,
  - (iv) 0.01 to 1% of a preservative, and
- the balance being other excipients, flavours and colourants, propellants and water.

The preferred ingredients for the composition of this invention are as follows:

- A. Frothing agent is selected from emulsifiers of the sorbitol ester, glycerol ester or fatty acid sucrose ester types. Most preferred are glycerol monostearate, sorbitol monostearate which generally produce the best foam with the least affect on flavour. The frothing agent also aids in the stable dispersion of the flavour agents.
- B. The sweetener may be selected from artificial sweeteners such as saccharine, aspartame dextrose, fructose or from natural sweeteners such as sucrose. Typically artificial sweeteners are used in the range 0.1 to 5% whilst natural sweeteners are

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5 normally in the range 5 to 75%. The most reliable  
sweetener is sucrose and the level of sweetener  
required is constrained by adequacy in providing  
sweetening effect at the lower end of the scale and  
by viscosity and solubility at the upper end of the  
concentration range. Excessive levels when combined  
with other exipients can produce crystalline growth  
in the aerosol cans which results in valve  
blockages. The most preferred sweetener is sucrose  
10 used at a level of between 15% - 75%. Typically a  
representative formula is :

	%
Flavour	3.0
Sucrose	61.0
15 Water	28.99
AZO Red Dye	0.010
Nitrous Oxide	7.0

C. Careful selection of the thickener is  
required because the product is normally used at a  
20 dilution of around 10% and with conventional  
thickeners such as pectin, tragacanth, the ten-fold  
concentration in the aerosol product would result in  
a viscosity that was too high to allow proper  
dispensing from the aerosol can. Thus, preferred  
25 thickeners are gums of the polysaccharide type  
particularly those of a grade which undergo  
interaction with milk to produce a large increase in  
milk viscosity after contact. A number of the gums  
tested showed a tendency to age thicken when stored  
30 over a period of time. This aging tendency was  
reduced by addition of water softening components of  
the phosphate type. Preferred thickeners are  
carragheenan, methylcellulose,  
hydroxypropylcellulose, and general polysaccharides.

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An example of thickeners follows:-

	%
Flavour	3.0
Sucrose	50.0
5 Water	45.95
Xanthane Gum	1.0
Sodium Hexametaphosphate	0.05
Nitrous Oxide	7.0

10 D. The colouring agents should be present in the range of 0.01 to 5% preferably 0.01 to 1%. Variation of the other components of the composition tends to produce variable affects on colour. Many colours also increase the corrosivity of the formula to the aerosol container. The preferred colouring  
15 agents are asodyes of the ponceau 4R, erythroscine, carmoisine, and tartrazine type.

E. The preservative needs to be selected from the range of approved food preservatives. Preferred  
20 preservatives are selected from methyl p-hydroxybenzoate, potassium sorbate, sodium benzoate, sulphur dioxide, and potassium phosphate. By balancing a blend of the previously discussed ingredients and maintaining a pH in the neutral range affective preservation can be achieved.  
25 Preferred preservatives are particularly the sodium and potassium benzoates, sorbates and phosphates which ensure a microbiostatic, microbiocidal and fungicidal affect and as well reduce corrosion of lacquered tinsplate to the point where shelf life is  
30 in excess of twelve months at 20°C are achievable. Microbiological examination of the product was carried out using combinations of potassium sorbate and sodium benzoate. The product was prepared over the pH range of between 2-8. Although effective  
35 bacterial control is achieved at low pH i.e. 3-5 there was a considerable tendancy for pitting

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corrosion and severe colour fading. Different chemicals were used to adjust the acidity of the solution. These included citric acid, tartaric acid, ascorbic acid, hydrochloric acid, sulphuric acid, phosphoric acid. The most preferred agent was ascorbic acid used at a level of 0.05-0.1%. An example of a preferred formulation is as follows:-

	%
Flavour	3.0
Sucrose	60.0
Potassium Sorbate	0.10
Sodium Benzoate	0.05
Water	29.84
Nitrous Oxide	7.0
AZO Red Dye	0.010

pH of the above product was adjusted to pH 4.5 with ascorbic acid.

F. Where unlined aerosol containers are used, rust can be a problem particularly if acidic components are used, thus a rust inhibitor within the range of 0.01 to 2% may be included. Preferably the rust inhibitor is selected from sodium benzoate, glycerine, propylene glycol potassium phosphate, or other food approved bufferable inhibitors. The sodium benzoate and potassium phosphate are preferred because they also function as a preservative.

G. The balance of the mixture is made up with purified water.

H. The propellant to be used to dispense the composition from the aerosol can will comprise 2 to 50% by weight and can comprise any food approved propellant. Preferably nitrous oxide, carbon dioxide and octafluorocyclobutane, or propane may be used. However, the most preferred propellant is nitrous oxide in order to achieve the optimum performance

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required for this particular composition. Due to its non-condensable nature a higher pressure can be used to ensure mixing with nitrous oxide than with condensable propellants. In addition, the condensable propellants tend to produce a shaving-cream type foam due to their densities and settle out of the system. Care must be taken if carbon dioxide is used as propellant because it is acidic. However, it could be used where lined aerosol cans are used.

A further preferred composition for an aerosol dispensable thickening and flavouring composition is as follows.

	<u>Components</u>	<u>Percentage by Weight</u>
15	Flavour	3%
	Potassium Sorbate	0.20%
	Polysaccharide Gum	0.20%
	Aso Red Dye	0.10%
	Sorbitan mono stearate	1%
20	Nitrous Oxide	6%
	Succrose	40%
	Purified Water	49.5%

All percentages given in this specification are by weight.

This product can be packaged in plain tinplate or aluminium as the level of preservative is sufficient to prevent corrosion. However, an epon lined tinplate or aluminium aerosol can can also be used. These plastic lined containers are acceptable for food products. From the above, it can be seen that the present invention provides a unique synergistic blend of ingredients which achieves the product requirements required to meet the consumer and Health Regulation requirements.



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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An aerosol dispensable composition comprising in combination
  - (i) 0.05 to 5% of a frothing agent
  - (ii) 0.05 to 75% of a sweetener
  - (iii) 0.05 to 10% of a thickener
  - (iv) 0.01 to 1% of a preservative, and,the balance being selected from other excipients, flavours and colourants, propellants and water.
2. An aerosol dispensable composition according to claim 1 wherein the frothing agent is selected from emulsifiers of the sorbitol ester, glycerol ester and fatty acid sucrose ester types.
3. An aerosol dispensable composition according to claim 1 wherein the frothing agent is glycerol monostearate and/or sorbitol monostearate.
4. An aerosol dispensable composition according to claim 1 wherein the sweetener is selected from the group of artificial sweeteners including saccharine, aspartame, dextrose and fructose.
5. An aerosol dispensable composition according to claim 1 wherein the sweetener is an artificial sweetener present in amounts of from 0.1 to 5%.
6. An aerosol dispensable composition according to claim 1 wherein the sweetener is a natural sweetener present in amounts of from 5 to 75%.
7. An aerosol dispensable composition according to claim 1 wherein the thickener is selected from the group of gums of the polysaccharide type including carragheenan, methylcellulose, hydroxypropylcellulose and general polysaccharides.

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8. An aerosol dispensable composition according to claim 1 wherein the preservative is selected from the group of methyl p-hydroxybenzoate, potassium sorbate, sodium benzoate, sulphur dioxide and potassium phosphate.
9. An aerosol dispensable composition according to claim 1 wherein the preservatives are selected from sodium and potassium benzoates, sorbates and phosphates and the pH of the composition is maintained in the neutral range.
10. An aerosol dispensable composition according to claim 1 wherein the colorants are present in the range of 0.01 to 5%.
11. An aerosol dispensable composition according to claim 1 wherein the colorants are selected from the group of asodyes of the ponceau 4R, erythroscine, carmoisine, and tartrazine type.
12. An aerosol dispensable composition according to claim 1 additionally including a rust inhibitor within the range of 0.01 to 2%.
13. An aerosol dispensable composition according to claim 1 additionally including a rust inhibitor selected from the group of sodium benzoate, potassium phosphate, glycerine and propylene glycol.
14. An aerosol dispensable composition according to claim 1 wherein the propellant is selected from nitrous oxide, carbon dioxide, octafluorocyclobutane and propane.
15. An aerosol dispensable composition substantially as described in the examples.

# INTERNATIONAL SEARCH REPORT

International Application No. **PCT/AU 85/00135**

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> <small>International classification symbols apply (see Art. 17)</small> According to International Patent Classification (IPC) or to both National Classification and IPC <b>Int. Cl. A23C 9/00, 23/00, A23L 1/42, C09K 3/30</b>																										
<b>II. FIELDS SEARCHED</b> <div style="text-align: right; font-size: small;">Minimum Documentation Searched <sup>7</sup></div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 20%; text-align: left; padding: 5px;">Classification System</th> <th style="text-align: left; padding: 5px;">Classification Symbols</th> </tr> <tr> <td style="text-align: center; padding: 5px;"><b>IPC</b></td> <td style="padding: 5px;"><b>A23C 9/00, 23/00, A23L 1/19, 1/34, C09K3/30</b></td> </tr> </table> <div style="text-align: center; font-size: x-small; margin-top: 5px;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>8</sup></div>			Classification System	Classification Symbols	<b>IPC</b>	<b>A23C 9/00, 23/00, A23L 1/19, 1/34, C09K3/30</b>																				
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<b>AU: IPC as above</b>																										
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%; text-align: left; padding: 5px;">Category <sup>6</sup></th> <th style="text-align: left; padding: 5px;">Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup></th> <th style="text-align: left; padding: 5px;">Relevant to Claim No. <sup>13</sup></th> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">US,A, 3622354 (DIAMOND) 23 November 1971 (23-11-71)</td> <td style="padding: 5px;">(1-15)</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">US,A, 3615718 (WEINSTEIN) 26 October 1971 (26-10-71)</td> <td style="padding: 5px;">(1-15)</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">US,A, 4343825 (TAKADA) 10 August 1982 (10-08-82)</td> <td style="padding: 5px;">(1-15)</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">GB,A, 1196286 (WEINSTEIN) 24 June 1970 (24-06-70)</td> <td style="padding: 5px;">(1-15)</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">AU,B, 28005/71(453541) (CARNATION COMPANY) 6 October 1972 (06-10-72)</td> <td style="padding: 5px;">(1-15)</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">AU,B, 28627/67(422391) (GENERAL FOODS CORPORATION) 24 April 1969 (24-04-69)</td> <td style="padding: 5px;">(1-7)</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">AU,B, 16692/62(268412) (UNILEVER LIMITED) 17 October 1963 (17-10-63) See example 3</td> <td style="padding: 5px;">(1-7)</td> </tr> </table>			Category <sup>6</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>	X	US,A, 3622354 (DIAMOND) 23 November 1971 (23-11-71)	(1-15)	X	US,A, 3615718 (WEINSTEIN) 26 October 1971 (26-10-71)	(1-15)	X	US,A, 4343825 (TAKADA) 10 August 1982 (10-08-82)	(1-15)	X	GB,A, 1196286 (WEINSTEIN) 24 June 1970 (24-06-70)	(1-15)	X	AU,B, 28005/71(453541) (CARNATION COMPANY) 6 October 1972 (06-10-72)	(1-15)	X	AU,B, 28627/67(422391) (GENERAL FOODS CORPORATION) 24 April 1969 (24-04-69)	(1-7)	X	AU,B, 16692/62(268412) (UNILEVER LIMITED) 17 October 1963 (17-10-63) See example 3	(1-7)
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<div style="display: flex; justify-content: space-between; font-size: x-small;"> <div style="width: 45%;"> <p><b>* Special categories of cited documents: <sup>14</sup></b></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p> </div> </div>																										
<b>IV. CERTIFICATION</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">           Date of the Actual Completion of the International Search  <b>13 September 1985 (13-09-85)</b> </td> <td style="width: 50%; padding: 5px;">           Date of Mailing of this International Search Report  <b>(24-09-85) 24 SEPTEMBER 1985</b> </td> </tr> <tr> <td style="padding: 5px;">           International Searching Authority  <b>Australian Patent Office</b> </td> <td style="padding: 5px;">           Signature of Authorized Officer  <div style="text-align: center;">   <b>R. E. GRANT</b> </div> </td> </tr> </table>			Date of the Actual Completion of the International Search <b>13 September 1985 (13-09-85)</b>	Date of Mailing of this International Search Report <b>(24-09-85) 24 SEPTEMBER 1985</b>	International Searching Authority <b>Australian Patent Office</b>	Signature of Authorized Officer <div style="text-align: center;">   <b>R. E. GRANT</b> </div>																				
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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
X	AU,B, 64173/60(240641) (NATIONAL DAIRY PRODUCTS CORPORATION) 6 September 1962 (06-09-62)	(1-7)
X	AU,B, 22793/62(264525) (AMERICAN VISCOSE CORPORATION) 9 April 1964 (09-04-64)	(1-8)
Y	US,A, 3503757 (RUBENSTEIN) 31 March 1970 (31-03-70)	(1-7)
Y	US,A, 3845231 (NAGASAWA) 29 October 1974 (29-10-74)	(1-7)
A	US,A, 2294172 (GETZ) 25 August 1942 (25-08-42)	1
A	US,A, 3072487 (WEBSTER) 8 January 1963 (08-01-63)	1
Y	US,A, 3970584 (HART) 20 July 1976 (20-07-76)	(2-7)
A	US,A, 2155260 (DILLER) 18 April 1939 (18-04-39)	1

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON  
INTERNATIONAL APPLICATION NO. PCT/AU 85/00135

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Patent Document Cited in Search Report		Patent Family Members			
US	4343825	JP	56042555		
GB	1196286	BE	731157	CH	511569
		IL	28181	NL	6708875
		ES	346762	DE	1551353
				BR	6790729
US	3970584	AU	64415/74	CA	1027868
		FR	2217405	GB	1457031
		JP	49113780	NL	7401544
DE	2406109				
IT	1008800				
AU	28005/71	CA	919493	DE	2122033
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